COURSE DESCRIPTION CARD - SYLLABUS

Course name

PO 2.2.1 Internet rzeczy - EC 2.2.1 Internet of Things

Course

Field of study
Teleinformatics

Year/Semester
1/2

Area of study (specialization)

Profile of study
general academic

Level of study
second-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
30

Laboratory classes
30

Other (e.g. online)

Tutorials
0

Projects/seminars
0/0

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
prof. dr hab. inż. Mariusz Głąbowski
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Responsible for the course/lecturer:
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Prerequisites

- Students have a basic knowledge of the TCP / IP stack protocols

- Students understand the communication process between network devices
- Students know the basics of object-oriented programming
- Students know how to configure IP network nodes in terms of second and third layer protocols
- Students know how to create applications in any object-oriented programming language
- Stduents are ready to work in a group

Course objective

The aim of the module is to familiarize students with the key hardware and software elements of the Internet of Things. Students learn about the application areas of the Internet of Things and the problems related to human-machine and machine-machine interaction. The aim of the module is also to familiarize students with the methods, techniques and tools used in the design and optimization of the Internet of Things. An important goal is also to familiarize students with the broadly understood issues of cybersecurity of the Internet of Things.

Course-related learning outcomes

Knowledge

Students know advanced methods of modeling, designing, and optimizing ICT networks that make up the Internet of Things.
Students know advanced techniques for solving optimization problems in the Internet of Things.
Students have advanced knowledge of the architecture of the Internet of Things devices; configuring Internet of Things devices and in terms of mechanisms for managing and securing data in the Internet of Things.
Students have an extensive vocabulary in English in the field of the terminology used in topics related to the Internet of Things and Big Data processing.

Skills

Students are able to educate themeselves, gaining the knowledge necessary to understand and solve problems occurring in the Internet of Things.
Students can work in a group, actively participating in the planning of the course and the implementation of laboratory classes related to the Internet of Things.
Students can conclude based on the results of experiments conducted during laboratory classes.
Students able to use libraries available for the Python programming language in the processing of large data sets.

Social competences

Students are aware of a progress and the resulting need for continuous training in the field of the Internet of Things.
Students are aware of the responsibility for joint work in teams implementing ICT projects.
Students are aware of the responsibility for the results of their work, which has a direct impact on the safety of people and devices that make up the Internet of Things.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified during an oral and / or written test.
Test issues, based on which questions are developed, are sent to students by e-mail and / or posted on the ekursy.put.poznan.pl website.
Passing threshold: 50% of points.
The skills acquired during the laboratory classes are verified on an ongoing basis. At each laboratory class, the correctness of the network devices configuration is assessed on a scale from 2 to 5. The final grade is the average of the grades obtained from individual laboratory classes.

Programme content

Basic concepts of the Internet of Things
The fields of application of the Internet of Things
IoT architectures and reference models
Architectures and reference models of the Industrial Internet of Things
Network technologies for the Internet of Things
Cloud and fog computing
Review of ICT security problems in Internet of Things solutions
Cybersecurity of the Internet of Things devices layer
Cybersecurity of the Internet of Things communication layer
Introduction to Big Data: data characteristics and value, data storage, data processing
The value of data in business, social and environmental applications
Database systems for the Internet of Things
Techniques of Big Data analysis
The use of Python in processing Big Data
Security of Big Data at rest, in motion, in use
Security of IoT applications
Risk assessment in IoT systems

Teaching methods

Lectures: multimedia presentations, illustrated with examples given on the blackboard.
Laboratory exercises: practical exercises in groups with the use of IoT devices.

Bibliography

Basic

- Erik Brynjolfsson, The second machine age: work, progress and prosperity in a time of brilliant technologies; W. W. Norton & Company, 2016
- Robert Stackowiak, Big Data and The Internet of Things: Enterprise Information Architecture for A New Age, Apress, 2015
- Peter Waher, Learning Internet of Things Paperback, Packt Publishing, 2015
- Gaston C. Hillar, Internet of Things with Python Paperback, Packt Publishing, 2016
- Onur Savas, Julia Deng, Big Data Analytics in Cybersecurity, Taylor & Francis Limited, 2021

Additional

- Cisco Networking Academy IoT course materials
- Mostapha Zbakh, Mohamed Essaaidi, Pierre Manneback, Chunming Rong, Cloud Computing and Big Data: Technologies, Applications and Security, Springer 2019
- Relevant references to up-to-date source materials, e.g. websites, scientific articles

Breakdown of average student's workload

	Hours	ECTS
Total workload	120	4.0
Classes requiring direct contact with the teacher	64	3.0
Student's own work (preparation for tests, preparation for laboratory classes, preparation for exam, literature studies)	56	1.0